Contents

Preface ix

SECTION I. BASIC STUDIES

Atomic scale characterization of organometallic vapor phase epitaxial growth using in-situ grazing incidence X-ray scattering *
D.W. Kisker, G.B. Stephenson, P.H. Fuoss, F.J. Lamelas, S. Brennan and P. Imperatori 1
The pyrolysis of precursors for GaAs MOCVD studied by in-situ and ex-situ Fourier transform infrared spectroscopy
S.R. Armstrong, R.D. Hoare, M.E. Pemble, I.M. Povey, A. Stafford, A.G. Taylor and J.O. Williams 10
Surface reactions of dimethylaminoarsine during MOMBE of GaAs
S. Salim, J.P. Lu, K.F. Jensen and D.A. Bohling 16
CBE growth of (001) GaAs: RHEED and RD studies
L. Samuelson, B. Junno, G. Paulsson, J.O. Fornell and L. Ledebo 23
Real-time monolayer growth oscillations detected by RD at pressures up to LP-MOVPE
J. Jönsson, K. Deppert and L. Samuelson 30
Optical monitoring of deposition and decomposition processes in MOCVD and MBE using reflectance anisotropy
S.R. Armstrong, R.D. Hoare, M.E. Pemble, I.M. Povey, A. Stafford, A.G. Taylor, P. Fawcette, B.A. Joyce, D.R. Klug, J. Neave and J. Zhang 37
Enhancement of AsH_3 decomposition on highly doped p-GaAs surfaces
N. Kobayashi and Y. Yamauchi 44
Gas phase monitoring of reactions under InP MOVPE growth conditions for the decomposition of tertiarybutyl phosphine and related precursors
G.H. Fan, R.D. Hoare, M.E. Pemble, I.M. Povey, A.G. Taylor and J.O. Williams 49
Two-dimensional modeling of the growth of GaAs from $(C_2H_5)_2GaCl$ and AsH_3
M.P. Hierlemann and T.F. Kuech 56

SECTION II. NEW PRECURSORS

Alternative group V sources for growth of GaAs and AlGaAs by MOMBE (CBE)
C.R. Abernathy, P.W. Wisk, S.J. Pearton, F. Ren, D.A. Bohling and G.T. Muhr 64
MOVPE growth of InGaAs/InAlAs using trimethylamine alane for photonic and electronic devices
A. Kohzen, Y. Tohmori, Y. Akatsu and H. Kamada 70
Vacuum chemical epitaxial growth of GaAs films using dimethylamine gallane
E. Malocsay, V. Sundaram, L. Fraas and A. Melas 76
New metalorganic gallium precursors for the growth of GaAs and AlGaAs by CBE
A.C. Jones, P.A. Lane, T. Martin, R.W. Freer, P.D.J. Calcott, M.R. Houlton and C.R. Whitehouse 81
Triisopropylindium for OMVPE growth
C.H. Chen, C.T. Chiu, G.B. Stringfellow and R.W. Gedridge, Jr. 88
Use of high purity trimethylindium–trimethylamine adduct in MOVPE of InP
V. Soulière, P. Abraham, J. Bouix, M.P. Berthet, Y. Monteil, A.M. Pougnet, R. Mellet, A. Ougazzaden and A. Mircea 93
A method for dosing solid sources for MOVPE: excellent reproducibility of dosimetry from a saturated solution of trimethylindium
D.M. Frigo, W.W. van Berkel, W.A.H. Maassen, G.P.M. van Mier, J.H. Wilkie and A.W. Gal 99

* Invited paper.

The LP-MOVPE of GaInAs with saturated group III precursors
R. Hövel, W. Brysch, N. Neumann, K. Heime and L. Pohl 106
Improved compositional uniformity of InGaAsP grown by low pressure metalorganic vapor phase epitaxy using tertiary butyl phosphine as the phosphorus source
J.L. Zilko, P.S. Davisson, L. Luther and K.D.C. Trapp 112
OMVPE growth of AlP/GaP superlattices using tertiarybutylphosphine as a phosphorus source
A. Wakahara, X.L. Wang and A. Sasaki 118
MOVPE growth of InGaAsP using TBA and TBP with extremely low V/III ratio
M. Horita, M. Suzuki, Y. Matsushima 123
Comparison of the As compounds tertiarybutylarsine and monoethylarsin
R. Hövel, N. Neumann and K. Heime 129
In-situ formation of As–H functions by β-elimination of specific metalorganic arsenic compounds for the MOVPE of III/V semiconductors
G. Zimmermann, H. Protzmann, W. Stolz, E.O. Göbel, P. Gimmnich, A. Greiling, J. Lorberth, C. Thalmann and K. Rademann 136
Tertiarybutyldimethylantimony for InSb growth
C.H. Chen, K.T. Huang, D.L. Drobeck and G.B. Stringfellow 142
The growth of InSb using triisopropylantimony or tertiarybutyldimethylantimony and trimethylindium
R.M. Biefeld and R.W. Gedridge, Jr. 150
Chemical beam epitaxy of GaAs films using single-source precursors
J.G. Ekerdt, Y.M. Sun, M.S. Jackson, V. Lakhotia, K.A. Pacheco, S.U. Koschmieder, A.H. Cowley and R.A. Jones 158

SECTION III. CHEMICAL BEAM EPITAXY

The effect of growth temperature instability in the CBE growth of $In_xGa_{1-x}As_yP_{1-y}$/InP multiple quantum well structures
T.H. Chiu, M.D. Williams, T.K. Woodward, J.E. Cunningham, J.E. Zucker, T. Sizer, F.G. Storz, J.F. Ferguson and W.T. Tsang 165
Effect of surface orientation on GaInAsP material composition in MOMBE (CBE)
H. Heinecke, B. Baur, R. Höger, B. Jobst and A. Miklis 170
Chemical beam epitaxy of GaInP on GaAs(100) substrates and its application to 0.98 μm lasers
R.M. Kapre, W.T. Tsang, Y.K. Chen, M.C. Wu, M.A. Chin and F.S. Choa 176
A study of Ar ion laser-assisted metalorganic molecular beam epitaxy of GaAs by reflection high-energy electron diffraction
H.K. Dong, B.W. Liang, M.C. Ho, S. Hung and C.W. Tu 181
Evidence for vertical superlattices grown by surface selective growth in MOMBE (CBE)
H. Heinecke, B. Baur, A. Miklis, R. Matz, C. Cremer and R. Höger 186

SECTION IV. SELECTIVE EPITAXY

Growth of semiconductor laser structures with integrated epitaxial Bragg reflectors on non-planar substrates
N.C. Frateschi and P.D. Dapkus 192
LP-MOVPE growth and optical characterization of GaInP/GaAs heterostructures: interfaces, quantum wells and quantum wires
F.E.G. Guimarães, B. Elsner, R. Westphalen, B. Spangenberg, H.J. Geelen, P. Balk and K. Heime 199
InP on patterned Si(001): defect reduction by application of the necking mechanism
A. Krost, M. Grundmann, D. Bimberg and H. Cerva 207
MOCVD selective growth of GaAs:C wire and dot structures by electron beam irradiation
T. Takahashi, Y. Arakawa, M. Nishioka and T. Ikoma 213
Selective area growth of GaAs and AlGaAs with TMGa, TMAl, AsH_3 and HCl by atmospheric pressure MOVPE
L. Korte, Chr. Thanner, M. Huber and Ch. Hoyler 220
Investigations on the influence of masks on the nature of selective area epitaxy
J. Thompson, A.K. Wood, N. Carr, P.M. Charles, A.J. Moseley, R. Pritchard, B. Hamilton, A. Chew, D.E. Sykes and T.-Y. Seong 227
Novel selective area growth of AlGaAs and AlAs with HCl gas by MOVPE
K. Shimoyama, Y. Inoue, K. Fujii and H. Gotoh 235
Studies on the selective OMVPE of (Ga,In)/(As,P)
C. Caneau, R. Bhat, M.R. Frei, C.C. Chang, R.J. Deri and M.A. Koza 243

Selective and non-planar epitaxy of InP, GaInAs and GaInAsP using low pressure MOCVD
E.J. Thrush, M.A. Gibbon, J.P. Stagg, C.G. Cureton, C.J. Jones, R.E. Mallard, A.G. Norman and G.R. Booker 249
Selective growth of ultra-low resistance GaAs/InGaAs for high performance InGaAs FETs
K. Hiruma, M. Yazawa, H. Matsumoto, O. Kagaya, M. Miyazaki and Y. Umemoto 255
Chlorine assisted selective area epitaxy in AP-MOVPE of InP: influence of CCl_4 on growth and on Zn and Si incorporation
V. Härle, B. Rose, D. Robein, Y. Gao, E. Landsbeck and F. Scholz 260

SECTION V. GROWTH RELATED STUDIES – III/V MATERIALS

V.A. Reactors

An approach to versatile highly-uniform MOVPE growth: the flow controlled stagnation point flow reactor
M. Kondo, A. Kuramata, T. Fujii, C. Anayama, J. Okazaki, H. Sekiguchi, T. Tanahashi, S. Yamazaki and K. Nakajima 265
The elimination of H_2O and SiH_4 in AsH_3
T. Ikeda, H. Noda and K. Matsumoto 272
GaInP multiwafer growth by LP-MOVPE for HBTs, lasers, LEDs or solar cells
D. Schmitz, G. Lengeling, G. Strauch, J. Hergeth and H. Jürgensen 278
Uniform growth of InSb on GaAs in a rotating disk reactor by LP-MOVPE
M.A. McKee, B.-S. Yoo and R.A. Stall 286
Application of an electrochemical arsine generator on a high throughput MOVPE reactor
A.A. Burk, Jr. 292
Quantum well GaAs/AlGaAs diode lasers grown in a PLANET OMVPE reactor
C.J. van der Poel, H.P.M.M. Ambrosius, R.W.M. Linders, N.J. Kiwiet and J. Rijpers 300
Cause and resolution of problem of erratic and decreasing trimethylindium bubbler delivery rates
L.W. Fannin, D.W. Webb and R.H. Pearce 307

V.B. Growth and characterization

OMCVD growth of InP, InGaAs, and InGaAsP on (110) InP substrates
R. Bhat, M.A. Koza, D.M. Hwang, M.J.S.P. Brasil, R.E. Nahory and K. Oe 311
Growth behavior of $(C_2H_5)_2GaCl$ and AsH_3 based GaAs: low reactor pressure and temperatures
T.F. Kuech, R. Potemski and F. Cardone 318
Deposition by LP-MOVPE in the Ga–In–As–P system on differently oriented substrates
B. Elsner, R. Westphalen, K. Heime and P. Balk 326
Optical characterization of MOVPE grown GaInP layers
M. Moser, C. Geng, E. Lach, I. Queisser, F. Scholz, H. Schweizer and A. Dörnen 333
Photoluminescence mapping of AlGaAs/GaAs HBT layer sequences
H. Tews, P. Zwicknagl, R. Neumann and M. Kärner 339
Splitting of degeneracy of valence band in strained GaAs layers observed from polarization of photoelectrons
T. Saka, T. Kato, T. Nakanishi, H. Aoyagi, T. Kosugoh, S. Nakamura, M. Tawada, M. Tsubata, H. Horinaka and Y. Kamiya 346
Growth of semi-insulating InGaAsP alloys using low-pressure MOCVD
D.G. Knight, W.T. Moore and R.A. Bruce 352
Metalorganic chemical vapor deposition growth of $Ga_{0.5}In_{0.5}P$ ordered alloys by phosphine modulation
M.K. Lee, R.H. Horng and L.C. Haung 358
MOVPE growth of InSb on GaAs substrates
R.M. Graham, N.J. Mason, P.J. Walker, D.M. Frigo and R.W. Gedridge, Jr. 363
Epitaxial growth of InSb on semi-insulating GaAs by low pressure MOCVD
Y. Iwamura and N. Watanabe 371
Growth of GaSb and InSb by low-pressure plasma MOVPE
M. Behet, B. Stoll, W. Brysch and K. Heime 377
Growth of GaSb and GaAsSb in the single phase region by MOVPE
D. Lu, X. Liu, D. Wang and L. Lin 383
Lattice-matched growth of InPSb on InAs by low-pressure plasma MOVPE
M. Behet, B. Stoll and K. Heime 389

Optimization of the growth by MOVPE of strained GaSb/InAs double heterojunctions and superlattices on [111] GaAs substrates
M. Lakrimi, R.W. Martin, N.J. Mason, R.J. Nicholas and P.J. Walker 395
Reproducible growth of $InAs_xSb_{1-x}$/InSb strained-layer superlattice photodiodes by low pressure MOCVD
R.M. Biefeld, S.R. Kurtz and S.A. Casalnuovo 401
InGaSb/GaSb photodiodes grown by MOVPE
F. Pascal-Delannoy, N.J. Mason, G. Bougnot, P.J. Walker, J. Bougnot, A. Giani and G.G. Allogho 409
Effect of substrate misorientation on the optical properties and hole concentration of $Ga_{0.5}In_{0.5}P$ and $(Al_{0.5}Ga_{0.5})_{0.5}In_{0.5}P$ grown by low pressure metalorganic vapor phase epitaxy
J.F. Lin, M.J. Jou, C.Y. Chen and B.J. Lee 415
MOVPE growth of GaAs using a N_2 carrier
H. Hardtdegen, M. Hollfelder, R. Meyer, R. Carius, H. Münder, S. Frohnhoff, D. Szynka and H. Lüth 420
The effects of oxygen impurity in TMA on AlGaAs layers grown by MOVPE
M. Hata, H. Takata, T. Yako, N. Fukuhara, T. Maeda and Y. Uemura 427
Current status of GaN and related compounds as wide-gap semiconductors *
T. Matsuoka 433
MOVPE growth of cubic GaN on GaAs using dimethylhydrazine
S. Miyoshi, K. Onabe, N. Ohkouchi, H. Yaguchi, R. Ito, S. Fukatsu and Y. Shiraki 439

V.C. Doping

Intrinsic carbon incorporation in very high purity MOVPE GaAs
M.C. Hanna, Z.H. Lu, E.G. Oh, E. Mao and A. Majerfeld 443
Crystal orientation dependence of impurity dopant incorporation in MOVPE-grown III–V materials
M. Kondo, C. Anayama, T. Tanahashi and S. Yamazaki 449
The effects of substrate misorientation on silicon doping efficiency in MOVPE grown GaAs
A.G. Thompson 457
Incorporation of zinc in MOCVD growth of $Ga_{0.5}In_{0.5}P$
S.R. Kurtz, J.M. Olson, A.E. Kibbler and K.A. Bertness 463
Tm doping of III–V semiconductors by MOVPE
F. Scholz, J. Weber, D. Ottenwälder, K. Pressel, C. Hiller, A. Dörnen, H. Locke, F. Cordeddu and D. Wiedmann 470
High doping performance of lattice matched GaInP on GaAs
F. Scheffer, F. Buchali, A. Lindner, Q. Liu, A. Wiersch and W. Prost 475
Simulation of carbon doping of GaAs during MOVPE
M. Masi, H. Simka, K.F. Jensen, T.F. Kuech and R. Potemski 483

SECTION VI. LOW-DIMENSIONAL STRUCTURES

VI.A. Growth and characterization

MOCVD methods for fabricating GaAs quantum wires and quantum dots *
T. Fukui, H. Saito, M. Kasu and S. Ando 493
Selective and shadow masked MOVPE growth of InP/InGaAs(P) heterostructures and quantum wells
G. Coudenys, I. Moerman, W. Vanderbauwhede, P. Van Daele and P. Demeester 497
Fabrication of InGaAs strained quantum wires using selective MOCVD growth on SiO_2-patterned GaAs substrate
M. Nishioka, S. Tsukamoto, Y. Nagamune, T. Tanaka and Y. Arakawa 502
Growth of InP related compounds on structures substrates for the fabrication of narrow stripe lasers
P. Grodzinski, J.S. Osinski, A. Mathur, Y. Zou and P.D. Dapkus 507
Anisotropic photoluminescence behaviour of vertical AlGaAs structures grown on gratings
G. Vermeire, Z.Q. Yu, F. Vermaerke, L. Buydens, P. Van Daele and P. Demeester 513
MOVPE growth of Si planar-doped AlGaAs/InGaAs pseudomorphic HEMT structures
H. Sakaguchi, T. Tsuchiya, T. Meguro, H. Nagai and S. Kuma 519

VI.B. Interface control and characterization

In situ control of heterointerface quality in MOVPE by surface photo-absorption
N. Kobayashi and Y. Kobayashi 525

Analysis of growth conditions for the deposition of monolayers of GaInAs, GaAs and InAs in InP by LP-MOVPE
W. Seifert, K. Deppert, J.O. Fornell, X. Liu, S. Nilsson, M.-E. Pistol and L. Samuelson 531
Effects of hydrogen-only interrupts on InGaAs/InP superlattices grown by OMVPE
A.R. Clawson, T.T. Vu, S.A. Pappert and C.M. Hanson 536
Interface optimization of GaInAs/GaInAsP (λ = 1.3 mm) superlattices by the use of growth interruptions
K. Streubel, J. Wallin, M. Amiotti and G. Landgren 541
Study of interrupted MOVPE growth of InGaAs/InP superlattice
X.S. Jiang, A.R. Clawson and P.K.L. Yu 547
Characterization of electrical and optical loss of MOCVD regrowth in strained layer InGaAs–GaAs quantum well heterostructure lasers
T.M. Cockerill, J. Honig, D.V. Forbes, K.J. Beernink and J.J. Coleman 553
Very smooth AlGaAs–GaAs quantum wells grown by metalorganic chemical vapor deposition
R.D. Dupuis, J.G. Neff and C.J. Pinzone 558
Metalorganic vapor phase epitaxy of GaAs on Si using II_a-fluoride buffer layers
A.N. Tiwari, A. Freundlich, B. Beaumont, S. Blunier, H. Zogg, S. Teodoropol and C. Vèrié 565
Characterization of AlGaP/GaP heterostructures grown by MOVPE
K. Adomi, N. Noto, A. Nakamura and T. Takenaka 570
Interface control in GaAs/GaInP superlattices grown by OMCVD
R. Bhat, M.A. Koza, M.J.S.P. Brasil, R.E. Nahory, C.J. Palmstrom and B.J. Wilkens 576
Characterization of interface structure in GaInAs/InP superlattices by means of X-ray diffraction
R. Meyer, M. Hollfelder, H. Hardtdegen, B. Lengeler and H. Lüth 583
Growth and characterization of type-II/type-I AlGaInAs/InP interfaces
M. Sacilotti, F. Motisuke, Y. Monteil, P. Abraham, F. Iikawa, C. Montes, M. Furtado, L. Horiuchi, R. Landers, J. Morais, L. Cardoso, J. Decobert and B. Waldman 589
Growth and characterization of InAs microclusters in InP and InAsP/InP heterostructures by low pressure MOCVD using tertiarybutylarsine
C.A. Tran, R.A. Masut, J.L. Brebner, R. Leonelli, J.T. Graham and P. Cova 596
Characterization of InP to GaInAs and GaInAs to InP interfaces using tilted cleaved corner TEM
M.J. Yates, M.R. Aylett, S.D. Perrin and P.C. Spurdens 604
MOVPE growth and characterization of InGaAs/In(GaAs)P and InGaASP/InP/InAlAs multi-quantum-well structures for electro-optic switching devices
N. Agrawal, D. Franke, N. Grote, F.W. Reier and H. Schroeter-Janssen 610

SECTION VII. OTHER MATERIALS

VII.A. High band gap II / VI semiconductors

MOVPE growth of p-type ZnSe using dimethylaminolithium as the dopant
K. Yanashima, K. Koyanagi, K. Hara, J. Yoshino and H. Kukimoto 616
MOCVD growth of $CuInSe_2$: first results
B. Sagnes, A. Salesse, M.C. Artaud, S. Duchemin, J. Bougnot and G. Bougnot 620
The effect of GaAs surface stabilization on the properties of ZnSe grown by organometallic vapor phase epitaxy
S. Akram, H. Ehsani and I.B. Bhat 628
Effect of MOVPE growth parameters on the photoluminescence linewidth of ZnS_xSe_{1-x} ($0 \leq x \leq 1$) epilayers on GaAs
M. Heuken, K.P. Geyzers, J. Söllner, A. Schneider, F.E.G. Guimarães and K. Heime 633
High resolution scanning transmission electron microscopy (STEM) and luminescence characterization of ZnS/ZnSe multi quantum wells (MQWs) grown by MOVPE
B. Bollig, P. Thorhauer, E. Kubalek, J. Söllner, F.E.G. Guimarães, M. Heuken and K. Heime 639

VII.B. Low band gap II / VI semiconductors

Growth of II–VI thin films from single-source precursors based on sterically encumbered sitel ligands
J. Arnold, J.M. Walker, K.M. Yu, P.J. Bonasia, A.L. Seligson and E.D. Bourret 647
Complete in situ laser monitoring of MOCVD HgCdTe/CdTe/ZnTe growth onto GaAs substrates
S.J.C. Irvine, J. Bajaj and H.O. Sankur 654
Properties of p-on-n heterojunctions made with MCT grown by MOCVD
S. Oguz, D.L. Lee, R.J. Olson, Jr. and E. Sullivan 664

Atomic layer epitaxy of CdTe on GaAs, by organometallic vapor phase epitaxy
W.S. Wang, H.E. Ehsani and I.B. Bhat 670
Coupled gas and surface reactions in the organometallic vapor-phase epitaxy of cadmium telluride
A.H. McDaniel, B. Liu and R.F. Hicks 676

VII.C. Oxides

Oxide ferroelectric materials grown by metalorganic chemical vapor deposition
A. Erbil, W. Braun, B.S. Kwak, B.J. Wilkens, L.A. Boatner and J.D. Budai 684
Metalorganic chemical vapor deposition of $YBa_2Cu_3O_{7-x}$ using a special equipment for solid precursors
C. Sant, P. Gibart, P. Genou and C. Vèrié 690

SECTION VIII. DEVICES

VIII.A. Lasers

OMVPE growth of AlGaInP/$Ga_xIn_{1-x}P$ strained quantum well structures and their applications to visible laser diodes
T. Katsuyama, I. Yoshida, J. Hashimoto, Y. Taniguchi and H. Hayashi 697
The performance and reliability of 800–880 nm InAlGaAs/AlGaAs and InGaAs/AlGaAs strained layer ridge waveguide lasers
A.H. Moore, N. Holehouse, S.R. Lee and R.F. Murison 703
MOCVD regrowth over GaAs/AlGaAs gratings for high power long-lived InGaAs/AlGaAs lasers
P.K. York, J.C. Connolly, N.A. Hughes, T.J. Zamerowski, J.H. Abeles, J.B. Kirk, J.T. McGinn and K.B. Murphy 709
Long wavelength InGaAsP/InP distributed feedback lasers grown by chemical beam epitaxy
W.T. Tsang, F.S. Choa, M.C. Wu, Y.K. Chen, R.A. Logan, S.N.G. Chu, A.M. Sergent, P. Magill, K.C. Reichmann and C.A. Burrus 716
A comparison of MOVPE grown strained and unstrained MQW lasers incorporating continuously graded or single composition confinement layers
N. Carr, J. Thompson, A.K. Wood, R.M. Ash, D.J. Robbins, A.J. Moseley and T. Reid 723
Low threshold 1.3 μm strained and lattice matched quantum well lasers
A. Mathur, P. Grodzinski, J.S. Osinski and P.D. Dapkus 730
Highly thermally stable, high-performance InGaAsP:InGaAsP multi-quantum-well structures for optical devices by atmospheric pressure MOVPE
A. Mircea, A. Ougazzaden, G. Primot and C. Kazmierski 737
Selective area regrowth of butt-joint coupled waveguides in multi-section DBR lasers
J. Wallin, G. Landgren, K. Streubel, S. Nilsson and M. Öberg 741
InGaAs/GaInAsP/GaInP strained-layer quantum well separate-confinement heterostructures grown by OMVPE
S.H. Groves 747
Low threshold $Ga_xIn_{1-x}P/(Al_yGa_{1-y})_{0.5}In_{0.5}P$ strained quantum well lasers
D.P. Bour, D.W. Treat, R.L. Thornton, T.L. Paoli, R.D. Bringans, B.S. Krusor, R.S. Geels, D.F. Welch and T.Y. Wang 751
Multiple quantum barrier structures and their application to high power visible laser diodes with strained InGaP active layers grown by MOCVD
K. Kadoiwa, T. Motoda, T. Nishimura, S. Arimoto, H. Watanabe, T. Kamizato, H. Mizuguchi and T. Murotani 757
MOVPE growth of InAlGaP-based visible vertical-cavity surface-emitting lasers
R.P. Schneider, Jr., R.P. Bryan, J.A. Lott, E.D. Jones and G.R. Olbright 763
MOVPE growth of short-period superlattices of AlP–GaP and its application for light-emitting diodes
A. Morii, H. Okagawa, K. Hara, J. Yoshino and K. Kukimoto 772
Iron redistribution studies in adjacent acceptor-doped InP layers: application to a new SI-BH laser structure
D. Robein, C. Kazmierski, D. Mathoorasing, B. Rose and Y. Gao 777

VIII.B. Other optoelectronic and electronic devices

$Ga_{1-x}In_xAs/InAs_yP_{1-y}/InP$ photodiodes for the 1.6 to 2.4 μm spectral region grown by low pressure MOCVD
M.A. di Forte-Poisson, C. Brylinski, J. di Persio, X. Hugon, B. Vilotitch and C. Le Noble 782
High performance microcavity resonator devices grown by atmospheric pressure MOVPE
J.S. Roberts, T.E. Sale, C.C. Button, J.P.R. David and A. Jennings 792

High efficiency GaAs-based multi-junction solar cells grown by metalorganic vapor phase epitaxy
B.-C. Chung, K.R. Wickham, M. Ladle Ristow and J.G. Werthen 801
High P/V ratio of GaInAs/InP resonant tunneling diode grown by OMVPE
T. Sekiguchi, Y. Miyamoto and K. Furuya 807
AlGaAs/GaAs heterojunction bipolar transistors with C-doped base grown by AP-MOVPE
S. Tanaka, M. Ito, M. Ikeda and T. Kikuta 812
OMVPE-grown $(Al_xGa_{1-x})_{0.5}In_{0.5}P$/InGaAs MODFET structures: growth procedure and Hall properties
K.H. Bachem, D. Fekete, W. Pletschen, W. Rothemund and K. Winkler 817
Improved Schottky gate characteristics for MOVPE-grown GaAs MESFETs
M.A. Tischler, D. Latulipe, T.F. Kuech, J.H. Magerlein and H.J. Hovel 824

Author index 829
Subject index 839